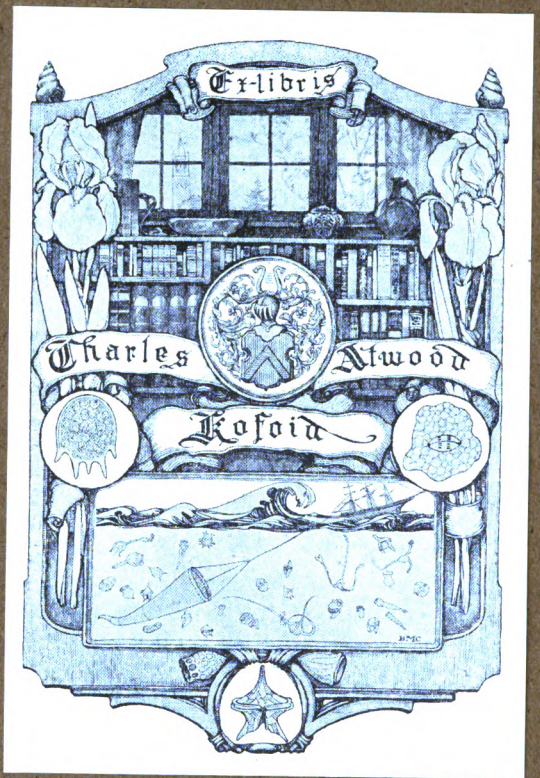

THE

ARTIFICIAL PRODUCTION

OF

FISH.

By PISCARIUS.

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THE

ARTIFICIAL PRODUCTION OF FISH.

THE object of this little book is to make known the means by which fish of all descriptions may be multiplied in rivers to an almost incalculable extent. The principle employed is not new in theory: but it is only within the last few years that any practical application of it on an extensive scale has taken place. This application has been made in France, and with success so complete and extraordinary as to be almost incredible. Our hope is, that it will be adopted on a grand scale in this country also. In Great Britain and Ireland there are rivers and streams, lakes and canals, innumerable; and they may be made to yield annually millions on millions of fish: we say millions, and say it on good authority.

It has been remarked, that the man who makes two blades of corn grow where only one grew before is a benefactor of humanity. If this be true, and true it is, we respectfully submit that our tiny volume is worthy of the attention of the legislator, the country gentleman, and the clergyman,—for it shows how an immense addi-

tion may be made to the people's food with scarcely any expense. To persons engaged in the fishing trade in rivers, and to professed anglers, it will, we conceive, recommend itself.

I.

The manner in which most fish propagate their species is of course well known to all readers.

"No sooner," in the words of a most distinguished naturalist, "does the sun of spring begin to spread its vivifying warmth, and no sooner does its renovating and irresistible influence penetrate to the depths of the waters," than a peculiar organ develops and increases in male fish. This organ, which is double, and which extends itself in the superior part of the abdomen, almost equalling it in length, has received the name of *milt*. The milt is the seminal or fecundating liquor. It grows gradually during several months; and then softens, or so to speak, melts or ripens, as spawning time approaches. When discharged from the fish it is of a milky colour.

When the milt begins to form in the male, the ovaries of the female begin to fill with eggs, which however are almost imperceptible. These organs are two in number in the greater part of fish, but only one in the others. Confined in a membrane, they occupy in the abdomen a place analogous to that which the milt occupies in males, and are nearly equal to it in length. The eggs they contain increase in proportion as the milt becomes tumified.

As the eggs grow they cause pain and become very burdensome to the female; until at length she is obliged to relieve herself of their weight and volume. This she

does by pressing her belly against pebbles, or any other hard substance at the bottom of the water. The eggs flow from her by the anus. She previously prepares a sort of hole to receive them.

Then comes the male, and by a like pressure he relieves himself of the milt, which flows also from the anus on to the eggs, and fecundates them. The fish afterwards cover up the eggs with sand or pebbles, or leave them, and in due time the eggs become transformed into fish.

II.

The quantity of eggs which the female fish of all sorts deposit is very considerable; of some it is truly prodigious. The carp, for example, produces about a quarter of a million at a time; the perch a great many more; the trout seven or eight hundred; the salmon several hundred; the sturgeon between six and seven millions; and the pike a vast number. A very small portion of milt suffices to give life to a large quantity of eggs. It would therefore appear that nothing in the world ought to be more abundant than fish of all descriptions.

But only a very small portion indeed of the eggs come to maturity; some naturalists calculate that not one in a hundred do so. Of the rest no inconsiderable portion are devoured by other fish. The males of some species, and indeed the females too, also eat their own eggs. And a great quantity are destroyed by getting mixed with mud and dirt.

III.

It certainly seems strange that man, who has done so many wonderful things,—who has, so to speak, scaled the heavens, to learn the movements of suns and planets, —who has plunged deep into the earth for mineral treasures,—who has turned many a mournful morass, and dreary forest, and barren waste, into fruitful corn-fields or abundant pasturages,—who has made the tremendous agent, electricity itself, docile to his will,—it is strange that he, with his vast ingenuity, should never have bethought him of taking measures for preserving the eggs of fish, and thereby secure to himself, in all climates and at all seasons, an abundant supply of wholesome food.

Still stranger perhaps is it to find, that though he has taken immense pains to discover the secrets of nature, even in matters of mere scientific, or, if we may so say, idle curiosity, centuries passed away before it occurred to him that he might do with fish what he has done for animals, and birds, and plants,—assist and control, and improve, the operations of nature; that is to say, that, instead of leaving the female to deposit her eggs and the male his milt, and then abandon them, he might cause the female to discharge her burden, and the male his fecundating liquor, where he pleased; that he might assist them in the operation; and that for so doing he might obtain a living fish from almost every egg.

But the strangest thing of all undoubtedly is, that when he *did* learn that he could produce fish as well as the fish themselves—when scientific naturalists discovered that by casting some of the male's milt on the female's eggs fish would be brought forth, as surely as if the operation had been done by the parents in the bed of a

river—it never struck him that herein was the means of increasing a million and a million fold, the production of his lakes and rivers and streams, and reservoirs and ponds—of making, in a word, the waters as fruitful, in their way, as the land is of corn and grain.

The ancient Greeks and Romans, who paid extraordinary attention to the breeding of fish, may, to be sure, have known something of all this; but if they did, their knowledge did not descend to us, and is therefore to us as though it had never existed.

As to the means of protecting the eggs of fish from the accidents of the waters, or the voracity of its occupants, none of incontestable efficiency are described in books or known in practice; and the proof of this is, that in France and Germany, England and Scotland, and indeed in every part of Europe, there have of late years been general complaints of the gradual yet rapid decline in the supply of various sorts of fish, not only in rivers, but on the coasts*.

With respect to what we will call the artificial production of fish—*i. e.* the taking by man of the female's eggs, and the fecundation of them by means of the male's milt applied by him—the first idea of it was conceived no further back than in 1758. It is, we believe, to Count Von Golstein, a German naturalist, that the scientific world is indebted for this grand conception; as also for

* Macculloch mentions that in France the annual supply of fresh-water fish before 1789 was 1,200,000. It fell some years back to 700,000, and has diminished since. The decline in our own rivers is well known; and this very year we have had alarming accounts from Scotland of the falling off in salmon. The yield of salt-water fish on the English, Scotch, Dutch, and French coasts is also far from what it was.

the first experiments which proved its truth. Having taken a female trout about to spawn, he pressed out her eggs, and then pressed on to them the milt of a male. After a certain number of days, he had the satisfaction of seeing young fish produced, which grew and flourished. Another German naturalist, Jacobi by name, made, a few years later, a similar experiment, with a like result; and, going a step further, he actually caused the milt to breed fish from the eggs of a *dead* female. In Italy, Spallanzani successfully experimented in a similar manner on the spawn of toads, and of certain descriptions of fish. At a later period, experiments were made with success on the eggs of salmon in Scotland by Dr. Knox, Mr. Shaw, and one or two others. And here in England the same sort of thing has been done.

But as we have already intimated, it never entered the mind of any of these great *savans*—nor of their successors—nor of the tens of thousands of persons who, in different countries, have made the natural history of fish a subject of study—that this way of breeding fish was something more than a simple scientific experiment, curious but useless,—that it was of practical and commercial, political and social importance, inasmuch as it might be made a new branch of commerce, which would add greatly to the national wealth, give employment to thousands, create an inexhaustible supply of cheap, nourishing, and wholesome provisions for all classes of the people—and be, in short, to rivers and waters what agriculture is to land.

For this glorious but singularly simple idea, the world is indebted to two humble fishermen, named Gehin and Remy, of an obscure village called La Bresse, in the department of the Vosges, in France.

IV.

The department of the Vosges is traversed by the Moselle, possesses many of the tributaries of that beautiful river, together with several streams and some lakes. The fine clear waters of all these, made them the most famous resort of trout in all France; and the production of that fish was so considerable, that it formed a large portion of the food of the population.

Several years ago, however, the yield was observed to decline, and it continued year after year to diminish. Messrs. Gehin and Remy made it their business to attempt to discover if any, and if so, what means could be devised for checking the evil. After studying night and day for a long time the habits of the trout, they came to the conclusion that it would be easy to preserve the eggs and to fecundate them by means of the milt of the male. Having watched the proceedings of the male and female at spawning time (it is in the month of November in the Vosges), they soon saw how they were to act. Their first experiment was crowned with extraordinary success. This was in 1841. In 1842, 1843, and 1844, they again repeated their experiments, and in each case in the most triumphant manner. In the latter year, to encourage them, the Société d'Emulation des Vosges gave them a bronze medal, and granted them a sum of money. They were subsequently employed to exercise their system in the different rivers and streams of the department, and in those of the adjacent departments. In the course of a short time they succeeded in stocking these waters with *millions* of trout.

It is to be observed, that although the fecundation of the eggs of fish by the means employed by Gehin and

Remy was, as we have seen, known to scientific ichthyologists, it was perfectly unknown to them. These poor men had never heard of Golstein or Jacobi, of Lacépède or Sannoni; they had probably never in their lives opened a book on the natural history of fish; consequently it was by their own unaided intelligence and patient investigation that they arrived at the discovery of the "great fact:" and surely the same credit is due to them for it as if it had been quite original. Though they came after Golstein, they rank as high—nay higher, for they had none of his instruction or means of observation.

Though bad news proverbially flies fast, information really useful to the public not unfrequently travels very slowly. It was so in this case. Until the beginning of 1849 nothing was heard of the discovery and its great results beyond the department of the Vosges and its immediate vicinity; and perhaps nothing would have been heard of it until this day, if an eminent and learned physician residing in the department, who had taken much interest in the matter, had not called attention to it. For thus taking the light from under the bushel, a very deep debt of gratitude is due to him, not only from his own countrymen, but from foreign nations.

This gentleman, Doctor Haxo of Epinal, perpetual Secretary of the Société d'Emulation, and member of the Conseil Académique of the Department of the Vosges, addressed, in the month of March, 1849, an admirably written communication to the Academy of Sciences at Paris, describing Gehin and Remy's *modus operandi* and its astonishing results. The sensation which this paper created was extraordinary, amongst the

public as well as in the Academy; and surprise was generally expressed at the singular fact that it should have fallen to two uneducated fishermen to show the practical value of a discovery known to the learned for nearly a century.

The Academy, seeing at once the immense national importance of the two fishermen's proceedings, hastened to call the attention of the Government to it. The Government, on its part, after making proper inquiries and finding all that was said was true, resolved, as was plainly its duty to do, to have the system applied to all the rivers in France, and especially to those in the poorer provinces. Gehin and Remy were accordingly summoned to Paris, and taken at once into the employment of the Government at good salaries; their duties being first to stock with fish, by their system, such rivers as should be pointed out to them, and next to teach that system to the peasantry. They were treated, too, as men who have made a great scientific discovery, and secured an immense benefit to their country. Many *savans* vied with each other in doing them honour; and the President of the Republic and his ministers made them dine at their tables and figure at their receptions. A Commission, consisting of distinguished scientific men, was appointed to superintend their operations.

V.

We now proceed to describe Gehin and Remy's plan as applied to trout. No great space will be required to do so, for, like most things that are really useful, it is of remarkable simplicity.

For the sake of convenience we put it into the shape of rules:—

1. Prepare a vessel containing about a quart of pure fresh water.

2. Take the female at the moment at which she is about to spawn. Hold her by the back with the left hand, with her head and body near you. If she tries to escape, pass the hand gently to and fro on her belly: this soothes her; if, however, she continues restless, get some one to hold her by the tail.

3. When she is tranquil, place her over the vessel containing the water, and with the thumb and finger of the right hand press gently on her belly downwards towards the tail. This pressure should be done in the same way as one would draw one's thumb and finger down a finger, or it may be compared to the milking of a cow; but care must be taken that it be not too heavy.

4. The eggs under the pressure will immediately spurt forth into the water. If they do not come easily, it is a proof that they are not sufficiently matured, and that they cannot consequently be fecundated. The fish should therefore be restored to the water for a few days.

5. Take a male and hold him in the same way; press with the thumb and finger gently down his belly, and cause the milt to spurt into the water. This milt will give the water a whitish colour. It spurts forth readily when perfectly butteraceous.

6. Both for male and female, the pressing operation must be repeated several times, until the fish be completely relieved of their respective burdens.

7. When these operations are terminated, stir up the water and its contents with the hand, or, which is better,

with the tail of a male fish still bearing traces of the milt.

8. After a few moments' repose, pour off the water slowly and put in more.

9. Before the mixing, the eggs will be observed to be of a pale orange-colour and very transparent; after it they become brownish, and a small black spot is perceived in the middle.

10. Change the water once or twice.

11. The fecundation being now complete, some of the eggs will be perceived to be white. These are the sterile ones, and must be picked out, otherwise they will corrupt the rest.

Having proceeded so far, the next operation is to provide for the preservation of the eggs.

12. Take a round box in the form of a warming-pan, with the centre of the bottom pressed in, so as to cause it to stand firmly. Let the box be made of zinc, to prevent rust. Let it be eight inches in diameter, with a lid one-and-a-half high, opening with a hinge. Riddle it completely with small holes in all directions, and let the edges of the holes be quite smooth.

13. Place in the box a layer of fine gravel.

14. Then take about one fish's spawn of the fecundated eggs.

15. Close the box, place it in the bed of a current of pure water, cover it with shingle and pebbles, and leave it; but see that the water passes freely through it, as it is necessary for the eggs to be slightly agitated.

This done, the operator must wait until the time shall arrive at which the exclusion, or hatching of the eggs, will take place. The period varies from two to four months. It cannot, however, be fixed with any preci-

sion, as it depends on the nature and quality of the water, the soil over which it flows, and other local circumstances. But there can be no difficulty on the point, as the box may be taken out and examined from time to time.

Instead of a box the eggs may be placed in a hole in the bed of the stream, and covered with pebbles. But in that case the progress of the transformation of the eggs cannot be followed. Besides, the box covered with pebbles is a better preservative against the admission of mud and dirt, which is injurious to the eggs.

When the time of exclusion has arrived, the tail is first formed, and the little rents in the egg which its formation causes become the lower fins. The head afterwards appears at the other extremity, and the rents on either side form the upper fins. The lower part of the egg composes the belly; the upper, which subsequently breaks, the back. The pellicle which covers the embryon does not fall, but becomes developed with it.

16. Keep the little fish in the box from eight to fifteen days, according as they are more or less numerous. Then set them at liberty. But

17. Take care not to let them go into water different to that in which they were born; as more or less freshness or limpidity may be injurious to them. The water should, too, be tranquil.

18. If the young fish be confined to a particular part of the stream, or if they be in reservoirs, it will of course be necessary to supply them with food. At first the spawn of frogs will suit them very well. When they get stronger the more substantial food of chopped meat, or the intestines of sheep and oxen torn into very narrow shreds, should be supplied. It is preferable, how-

ever, to procure an abundance of small fish, especially of those which derive their principal sustenance from aquatic plants.

The average weight of the trout, produced by the above means, is about four and a half ounces at the end of the second year, and nine at the end of the third.

Modifications of the rules here given may be attempted. Thus, the holes in the box may be made so large as to enable the fish to escape when so disposed, which would do away with the trouble of watching them:—secondly, they may be placed and brought up in large boxes containing coagulated blood, or other descriptions of food, so as to make a comparison between their growth and those left at large. In fact, innumerable experiments may be attempted; but they will suggest themselves to the mind of the operator practically acquainted with fish.

When the trout are destined to stock a river, it is advisable to produce them in one of its tributaries, where they will remain until they are active or strong enough to escape or resist the enemies which they find in the deeper waters of rivers.

If they be destined for reservoirs or ponds, care must be taken not only not to place voracious fish with them, but to separate them according to their ages,—those of three years from those of two, and those of two from those of one. The reason for this is, that the larger trout devour the smaller ones.

VI.

It has been already stated, that in the course of a very short time Messrs. Gehin and Remy, by the application

of their system, succeeded in introducing several million trout into the rivers and streams of the Vosges. In a report to the Academy of Sciences at Paris, by Dr. Haxo, in 1849, we read that, in addition to this, "they had formed a piece of water belonging exclusively to them, in which they now have between *five and six million trout*, aged from one to three years; and the production of this year will increase that vast number by several hundred thousand." Since then, of course, the quantity has immensely increased; we scarcely like to express the estimate in figures, lest, from its enormity, it should appear exaggerated.

Shortly after Dr. Haxo had, by his communication to the Academy, called public attention to the discovery, very liberal offers were made to Gehin and Remy, by the Governments of Spain and Holland, to introduce their system into those countries, but they declined to quit France.

Since they have been taken into the service of the French Government, they have stocked streams and rivers at Allevard, Pontcharra, Sassenage, Veurey, Vizille, Bourg d'Oisans, Rives, Pont-en-Royans, Paladru, Lemps, St. Geoire, Arandon, La Buisse, and Grenoble, in the department of the Isère; in numerous places in the department of the Haute Loire; also in the departments of the Allier, the Lozère, the Meuse, the Meurthe, the Haute Saône, and several others.

M. de Caumont, a gentleman of property, has experimented on their system in Normandy with great success; as have also the director of the canal from the Rhone to the Rhine, in the vast reservoirs of Huninguen, and different noblemen and gentlemen in Burgundy, in Brie, in the neighbourhood of Dijon, and in numerous other parts of the country.

VII.

Important as is the system described, Messieurs Gehin and Remy have invented another which will produce even more extraordinary results.

It is well known that it is difficult to naturalize fish peculiar to one country in another country: nor is it easy even to remove with success fish from one river to another in the same country. The introduction of carp into England in the year 1514 was considered, it will be remembered, a very marvellous operation, and it is spoken of as such in every Natural History of Fish; and though it has long been known that fecundated eggs might be removed from place to place, it does not appear that in any country any great progress has been made in the stocking of rivers by that system.

But Remy and Gehin have got over all difficulty by their new fashion of removing, not the fish, *but the eggs*. To do this, these are the directions:—

1. Take a box similar to that already described.

2. Place in it a layer of fine sand; on that layer place one of pebbles of about the size of a nut; on the pebbles put a layer of fecundated eggs. Then begin again with a layer of pebbles and of eggs, and continue until the box be full.

3. Plunge the box into water to cause its contents to be consolidated, and send it off.

4. Take care during the journey to keep it in the open air.

5. On arriving at its destination, divide its contents into other boxes, in the proportion of one female's spawn for each.

6. Place the boxes in the bed of a stream, cover them up, and leave them, as already described.

7. The sand and pebbles placed in the boxes must be perfectly clear of earthy substances and dirt; and if, on opening them, there be any spoiled—that is, white—eggs, they must be removed.

VIII.

Although in the operations described trout only has been mentioned, the plan of the two fishermen is *applicable to every other description of fresh-water fish*, as well as *to those which, though living partly in fresh-water and partly in the sea, spawn in rivers.*

It has been TRIED in France on

Salmon;
Carp;
Pike;
Tench;
Perch;

and on other descriptions. And each experiment has been perfectly satisfactory.

IX.

To make experiments on the different sorts of English fish, it will only be necessary to follow the very simple directions already given; or if in one or two sorts any slight modification should happen to be required, they will be so self-evident as not to need description. As for the *time* of operating, that, of course, varies according to the species of the fish, and still more as to the temperature of the water. On this point, local knowledge can be the only guide.

Care must, of course, be taken to provide, in streams or reservoirs, a sufficient supply of fish for the fish to

feed on. Thus, when the system of artificial production is employed on an extensive scale, it will be necessary to breed some of the smaller descriptions of fish as food for the larger. In reservoirs, however, different sorts of food may be offered by way of experiment.

X.

Although it has been stated that it is necessary to place the fecundated eggs in the bed of a stream, it may be mentioned that an eminent French naturalist, M. Coste, professor at the Collége de France at Paris, has discovered that the stream may be done without; *he has produced salmon in a tub.*

He caused a large tub to be constructed, with conduits or canals placed one beneath the other, in such a way that water, on entering by the upper part of one canal, flowed to the lower part, and then descended into the canal beneath; and after flowing along it, descended into the one below, and so on until at last it escaped from the vessel. In each canal he placed a layer of gravel and pebbles, and on these a quantity of salmon's eggs, fecundated by Remy and Gehin's system, and sent up from the reservoirs of Huninguen, a distance of several hundred miles. The water flowed from a cistern, through an ordinary cock; and the only precaution taken was to keep the stream constantly going.

In due time the exclusion or hatching of the eggs took place, and the salmon are now alive and well.

By M. Coste's system several different descriptions of fish can be produced at the same time. But it may, perhaps, be doubted whether the fish will possess the same vigour or qualities as if produced in a natural

stream; and, at all events, M. Coste's plan is more curious than practically useful.

XI.

And now to conclude. It would be idle to dwell on the immense importance of stocking our waters with millions of fish,—*that* will be apparent to every one; and we shall be much disappointed if the system described be not taken up as warmly, and practised as extensively, in this country as it has been in France.

But in addition to its commercial importance as a new branch of industry, and its social value as affording a vast addition to the people's food, this system possesses the advantage of opening a boundless field to scientific curiosity. In the Danube and the Rhine, the Elbe and the Spree, and almost every other river in Germany; in the rivers and lakes of Russia and northern Europe; in the lakes of Switzerland; in the rivers of France; there exist either species of fish which we do not possess, or peculiar varieties of species which we do possess; and there is every reason to believe that very many of them, if not all, might be naturalized in our waters. The same remark will apply to some of the fish in the rivers and lakes of America, and even of the rivers of Asia or Africa. Nor is this all. Why should not the different races of fish be crossed, as well as those of animals and plants? Who can tell what the ingenuity of man may not produce by the happy adaptation of the milt of one description of male to the eggs of another description of female?

APPENDIX.

As almost always happens with the discoverers of curious and useful things, Messrs. Gehin and Remy have excited the jealousy of several influential parties, and amongst them some learned ichthyologists. These gentlemen could not bear the idea of seeing two humble and uneducated fishermen carry off the "glory" of a great discovery which *they* might have made but did not; and they have employed strenuous and perhaps somewhat unworthy efforts to strip the two poor men of their well-earned distinction. For ourselves, after a patient investigation of the facts of the case, we have no hesitation in repeating what we have said at page 10; namely, that although the learned world knew theoretically the principle of artificial production, Gehin and Remy discovered it, not from the teaching of books, but from patient observation; and that therefore the same credit is due to them for it as to their distinguished predecessors Golstein and Jacobi. And we add, that to them alone is owing the grand idea of turning the discovery to *practical* account in the stocking of rivers with fish.

To Dr. Haxo, of Epinal, also, we must repeat, that the world is under great obligation, for having taken the two fishermen under his protection, and made their process known. We, personally, are peculiarly indebted to him for the valuable information he has courteously placed at our disposal for the compilation of this little work.

The Doctor is particularly anxious that the honour of the discovery should not be wrested from his two *protégés;* and he has written to us on the subject as follows:—

"As you intend to make known to the English the pro-

cess employed for the artificial fecundation of the eggs of fish, do not fear, sir, to show yourself more equitable than certain French *savans* who have occupied themselves with this subject have hitherto been:—do not fear to proclaim aloud that it was in a village of the department of the Vosges that the problem of the artificial production of the eggs of fish was solved. In so doing you will be the organ of the truth; and the members of the Institute of France may do what they please; but they will not be able to deceive any except the superficial men who do not go to the bottom of things.

"I repeat what I have so often said—the problem of the artificial fecundation of the eggs of fish was only seen, and very imperfectly solved, by all the *savans* who have occupied themselves with it up to the present time. Spallanzani's experiments on this subject were not at all conclusive; and they were more connected with his experiments on electricity than with the solution of a problem of which he thought only as accessory to a more important matter. The researches of Rusconi and Jacobi are nearly in the same case; and though Golstein, towards the middle of the last century, obtained results more satisfactory, it is certain that he deduced no practical consequences from them, and that since then the question has remained in the same state.

"What proves this, is a paper read to the Institute in 1848 by M. de Quatrefages. If at that period the solution of the problem had been found, that *savant* would not have failed to have said it; whilst, on the contrary, he proves at every line that he considered the solution as still to be found, and he even indicated the means by which it might be arrived at.

"Well, sir,—equity requires that it shall be known that at that period two simple Vosgien fishermen, Remy and Gehin, of La Bresse, by means of care, practical observations, patience, and perseverance, succeeded in finding what

had long been vainly desired, that is to say, the means of artificially fecundating the eggs of trout, and of procuring the exclusion of them. The *savans* may rise in revolt against the fact, that two simple observers of nature, without any science, without even knowing how to read or write, have found alone what they, the *savans*, vainly sought for in their ponderous books: but truth will triumph over their ill-will, and it will remain acquired to the history of the natural sciences that our two fishermen are really the inventors of the process now generally adopted of the artificial fecundation of the eggs of fish.

"What I say to you, sir, of the ill-will of the French *savans* who have occupied themselves with the subject in question is so true, that not only does M. Milne Edwards, in a report to the Minister of Commerce, tend to give to others than our two fishermen the merit of the priority of the invention, but in a recent sitting of the Institute, in which the question was discussed by the same gentleman and M. Coste (*à-propos* of the experiments made by the Commission de Pisciculture), no mention whatever was made of the operations of the two fishermen, nor were their names even pronounced. This is grossly iniquitous; and on that account I express to you an ardent desire that a work, destined to make known the process in England, shall not commit a like injustice to my two countrymen.

"I beg of you to excuse me, sir, for insisting so much on this point. But you will understand as well as I do, how important it is to leave to our two fishermen the honour which belongs to them. They are not *savans*, it is true; they have not the advantage of being members of the Academy of Sciences: but what is theirs is theirs; and they cannot, without crying injustice, be deprived of the merit of an invention destined, as I believe, to obtain the most useful development, and a brilliant renown."